Asymmetry between Strong and Weak Quantifiers in Floating Quantifier Constructions

〔Articles〕

Asymmetry between Strong and Weak Quantifiers in Floating Quantifier Constructions

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Abstract

In this article I present an analysis of the distribution of floating numeral classifiers (weak quantifiers) and strong quantifiers in Japanese. I show a case in which (weak) quantifiers have been assumed to be excluded due to the lack of the structural association with the host NP, but it is improved significantly if they are replaced with strong quantifiers such as *zen'in* 'all'. In order to explain the asymmetric behavior between strong and weak quantifiers, I use Diesing's (1992) Mapping Hypothesis, which is slightly modified in accordance with Chomsky's (2000, 2001) Phase theory. The existential and universal variations are cyclically derived at the Phase level (vP and CP). Consequently, operations such as LF-undoing and LF reconstruction can be obviated.

Keywords: Weak and Strong Quantifiers, (A)symmetric Quantification, Mapping, Phase

1. Introduction

It is well known that numeral classifiers (henceforth #-CLs) in Japanese are allowed to appear in various positions in relation to their host NPs, as shown below:

(1) a. gakusei-ga hon-o 3-satsu yonda
student-Nom book-Acc 3-CL read
'Students read three books.'
b. hon-o gakusei-ga 3-satsu yonda
'Students read three books.'
c. *?gakusei-ga hon-o 3-nin yonda
'Three students read books/a book.'
d. gakusei-ga 3-nin hon-o yonda
'Three students read books/a book.

Generally (1c) is treated as unacceptable, or at least awkward in contrast to (1a, b and d). Under the standard analysis of the distribution of # CLs, a #-CL and its host NP must be structurally associated. The #-CL and its host NP in (1b) are apparently distant, but note that the #-CL is adjacent to the trace of the head noun, as shown in (2).

(2) hon-o gakusei-ga t(hon) 3-satsu yonda
'Students read three books.'

Along this line the unacceptability or awkwardness of (1c) can be attributed to the fact that the floating #-CL is adjacent neither to the host NP nor to its trace.

Some recent analyses concerning floating #-CLs, however, take sentences such as (1c) to be not necessarily unacceptable under a certain reading (Ishii (1999), Takami (1998), among others): i.e., distributive reading. The

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sentence (1c), for example, may be better in the scenario where three students read a book/books individually, not the one where the students together read a book. According to my informants, however, the acceptability of (1c) is still doubtful under the distributive reading. It will be argued that some other factor than distributive interpretation increases the acceptability in the type of sentences like (1c).

2. Stranding Analyses

There have been many approaches to floating quantifiers (henceforth FQs), but they are roughly divided into two analyses: the stranding analysis (see Sportiche (1989), Kawashima (1998), Bošković (2004), among others) and the adverbial analysis (see, e.g. Miyagawa (1989), Bobalijk (1995), among others). The most prominent one among the stranding analyses is probably Sportiche (1988). It has become common since the mid 80's (Fukui and Speas (1986), Sportiche (1988) among others) that the subject is generated within VP and then raises to the Spec of IP (the VP-internal Subject Hypothesis). Based on this hypothesis, Sportiche (1988) argues that the FQ is stranded within VP when the head nominal is moved to the Spec of IP, as illustrated in (3) and (4).

(3) [All the children]$_i$ have t_i seen this movie.

(4) [The children]$_i$ have [all t_i] seen this movie.

(Sportiche 1988: 426)

This analysis is favorable in that the distribution of FQs becomes predictable by looking at the trace (copy) left behind by A-movement of the element an FQ modifies. However, as is well known, this analysis exposes a serious problem: given that the subject of passive and unaccusative verbs starts in object position, it should be possible to float *all* in (5a-b) in object position.

(5) a. *The students arrived all.

b. *The students were scolded all.

Also, the sentence in (6) is analyzed as acceptable in view of the recent analyses where English has overt object shift (see Johnson (1991), Koizumi (1995), among others).

(6) *John hates the students all.

Since the quantifier *all* is left behind by shifting of the object DP, (6) should be acceptable, but that is not the case. In this way, simply associating the distribution of FQs with A-movement is not sufficient enough to make an explicit explanation concerning FQs.

Bošković (2004) examines the issue of why FQs are disallowed in the object position of passive and ergative verbs under Sportiche's (1988) stranding analysis. His main claim is that quantifiers cannot float in θ-positions. The unacceptability of (5) is due to the fact that the quantifier *all* is stranded in the Spec of VP, which is a θ-position. Under Bošković's analysis, *all* has to be inserted after the host nominal moves to a non-θ-position, as illustrated in (7).

(7) a. The students all laughed.

b. [$_{TP}$ the students$_i$ T[$_{FP}$ all t_i[$_{VP}$ t_i laughed]]].

As shown in (7b), it is necessary to assume that there is a landing site for the nominative between TP and VP. I simply assumed FP as the intermediating position for the ease of discussion, though FP in fact corresponds to AgroP in Bošković's mechanism.

(8) a. The students have all arrived.

b. [$_{TP}$ the students$_i$ have[$_{FP}$ all t_i[$_{VP}$ arrived t_i]]]

(9) a. *The students have arrived all.

b. [$_{TP}$ the students$_i$ have[$_{VP}$ arrived all t_i]]

The subject *the students* is generated in the complement position of the verb *arrive*, as standardly assumed.

According to Bošković, the quantifier *all* must adjoin acyclically when the relevant element moves to a non-θ -position. In the acceptable example (8b), *all* is inserted (adjoins) to the subject nominal in the non-theta position FP. On the other hand, in (9b) *all* is generated in the θ- position, which leads to ungrammaticality.

Bošković shows that his claim can explain the distribution of FQs in Japanese.

(10) a. *Gakusei-ga hanbaagaa-o 3-nin tabeta.
Student-Nom hamburger-Acc 3-Cl ate
"Three students ate a hamburger."
b. Gakusee-ga 3-nin hanbaagaa-o tabeta.
"Students-nom 3-Cl hamburger-Acc ate

It is well known that Japanese objects can be scrambled outside VP. The ungrammaticality of (10a) shows that the scrambled object cannot appear between the subject and the subject-associated FQ. According to Bošković, the subject NP is claimed to have left the FQ behind in a θ-position, hence ungrammatical. This derivation is represented as follows:

(11) $[_{TP}$ gakusei-ga$_i$ $[_{vP}$ hanbaagaa-o$_j$ $[_{vP}$ t_i 3-nin$[_{VP}$ t_j tabeta]]]]

On the other hand, the grammaticality of (10b) can be explained by assuming that the adjunction of the quantifier is conducted in a non-θ- position, namely, the Spec of TP. The relevant configuration, illustrated in (12), shows that the quantifier adjoins to the host NP acyclically in a non-θ- position.

(12) $[_{TP}$ gakusei-ga$_i$ 3-nin$[_{vP}$ t_i $[_{VP}$ hanbaagaa-o$[_{VP}$ tabeta]]]]

Bošković's analysis can apparently predict the contrastive behavior between (10a) and (10b), but there are several serious problems to be dealt with. First, note that the grammaticality of (10a) increases remarkably when the # CL *3-nin* is replaced with a strong quantifier such as *zen'in* 'all'.

(13) a. *Gakusei-ga hanbaagaa-o 3-nin tabeta.
Student-Nom hamburger-Acc 3-CL ate
"Three students ate a hamburger."
b. Gakusei-ga hanbaagaa-o zen'in tabeta.
student-Nom hamburger-Acc all ate
"All the students ate a hamburger."

Given that (13b) is derived in the same way as (10a), it follows then that the quantifier is stranded in a θ-position: it is wrongly predicted as ungrammatical.

Second, given Bošković's analysis, an unwanted syntactic structure would be formed in the middle of the derivation: that is, while the quantifier *all* can be inserted in Spec TP and in Spec AgrsP, respectively as in (14b-c), the quantifier *each* is not allowed to appear in Spec AgrsP, as shown in (15c), despite the fact that it is a non-theta position.

(14) a. The men have all picked up a glass.
b. $[_{AgrsP}$ the men$_i$ have$[_{TP}$ all t_i T$[_{VP}$ t_i picked up a purse]]]
c. $[_{AgrsP}$ all the men$_i$ have$[_{TP}$ t_i T$[_{VP}$ t_i picked up a purse]]]

(15) a. The men have each picked up a purse.
b. $[_{AgrsP}$ the men$_i$ have$[_{TP}$ each t_i T$[_{VP}$ t_i picked up a purse]]]
c. *$[_{AgrsP}$ each the men$_i$ have$[_{TP}$ t_i T$[_{VP}$ t_i picked up a purse]]]

Also, a closer examination reveals that an apparently legitimate configuration of (15b) raises a serious problem, though the derived sentence itself is acceptable. It is a wonder that the adjoined illegitimate noun phrase **each the men* can be allowed in Spec TP, although not in Spec AgrsP.

3. FQs and Presuppositional Reading

Here I would like to consider FQs along the lines of the adverbial analysis. Hoji & Ishii 2004 claim that the 'adverbial' #-CL is an operator of the tripartite structure of quantification.

(16) Mary praised every student

(17) a. [every student [Mary praised t]]

b. ∀x, student (x), Mary praised x

In English the quantifier and its complement NP forms a constituent, the former mapped to the operator, and the latter mapped to the restrictor, as illustrated in (17).[1] In Japanese, on the other hand, what gets mapped to the operator and the head nominal can occur separately, but the basic scheme is the same as the one in English. The sentence in (1d) is represented as in (18).

(18) gakusei-ga 3-nin hon-o yonda
(Restrictor) (Operator)

While maintaining the adverbial analysis, however, I will show that the restricted quantification illustrated in (18) should not be applied to the case with weak quantifiers. In other words, the floating #-CL do not only quantify over the restrictor under the concept of restricted quantification. More specifically, it is claimed that the #-CL in (18) should be interpreted not with respect to the set of students, but instead with respect to the set of the students who read a book (Higgibotham (1987), Enç (1991)). In other words, nouns associated with weak quantifiers such as a #-CL do not get mapped into the restrictor, but rather are subject to the "symmetric" and "intersective" quantification inside the nuclear scope (cf. Diesing (1992)).

I would like to make the discussion so far more explicit. Since Milsark (1977) NPs have been divided semantically into strong NPs, i.e., NPs introduced by a quantifier like *all* or *each*, and weak NPs, i.e., NPs introduced by a quantifier such as *some*, *many* or a numeral. It is well known that weak NPs are allowed to appear in existential sentences while strong NPs are not.

(19) a. There is/ there are a/ some/ many /few/ two student/students in the backyard.

b. *There is/ there are the/ all/ most/ both/ every student/students in the backyard.

Following Milsark (1974), Diesing (1992) argues that nominal phrases with strong quantifiers, unlike those with weak quantifiers, are necessarily presupposed. As Keenan (1987) suggests, existential sentences assert existence. This simple view allows a plausible account for why nominal phrases with strong quantifiers are generally excluded from existential sentences. That is, the assertion of existence brought by the existential construction is incompatible

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[1] As for expressions such as *every student*, I refer to *every* as a quantifier and *every student* as a quantified expression. This definition is different from the one in the theory of generalized quantifiers, where expressions such as *every* and *some* are refereed to as determiners.

[2] It has been noted that universal quantifiers in natural languages quantify over contextually given sets. The following examples presented by Enç (1991) are truth-conditionally equivalent.

(i) a. Sally danced with every man.

b. Sally danced with every one of the men.

(ia) does not entail that Sally danced with every man on earth, only that she danced with every contextually relevant man. According to Enç (1991), *contextually relevant* means 'already in the domain of discourse'. Consequently, if universal quantification is over contextually relevant sets of individuals, it follows that NPs that quantify universally are specific.

with presupposition of existence required by strong quantifiers. As claimed by Enç (1991), the nominal phrases with strong quantifiers receive specific reading (i.e., universally quantified NPs (strong NPs) are always specific).[2] On the other hand, weak NPs allow a non-specific reading, hence compatible with *there*-constructions. Weak NPs, also called non-presuppositional NPs, just assert the existence of individuals denoted by the NPs without presupposing their existence.

Another important difference is concerned with their quantificational properties. As suggested by Higginbotham (1984) and Enç (1991), weak quantifiers are characterized as 'symmetric' and 'intersective'. Consider the following examples.

(20) a. Two children are sick.
b. Two sick individuals are children.
c. The number of sick children is two. (Enç 1991: 23)

These sentences are truth-conditionally equivalent. (20a) and (20b) show that the weak quantifier *two* is symmetric because the function it denotes can be applied either to the set of sick individuals or to the set of children, with no difference to the truth conditions. The same logic does not hold of NPs introduced by strong quantifiers. Also (20c) indicates that weak quantifiers are intersective, because the function denoted by *two* can be applied to the intersection of the set of sick individuals and the set of children. Note that weak quantifiers such as numerals, *some*, and *many* are only concerned with the intersection of the two sets A and B. In this way, it is irrelevant to which of the sets the function denoted by a quantifier applies to; rather both of the sets are equivalent as predicates for the purposes of quantification.

Let us again see the structurally non-associated but truly acceptable sentences below, where the floating #-CLs are all strong quantifiers like *zen'in* 'all' and *dotiramo* 'both'.

(21) a. gakusei-ga hon-o zen'in yonda
'All (the) students read books/a book.'
b. sensei-ga banana-o dotira-mo tabeta
'Both of the teachers ate a banana.'
c. onnanoko-ga michibata-de saifu-o sorezore hirotta
'Each of the girls picked up a purse on the road.'

The grammatical distinction observed between weak quantifiers and strong quantifiers can neither be explained under the stranding analysis (cf. Sportiche (1988), Kawashima (1994) and Bošković (2004)), nor simply by assuming the tripartite structure as claimed by Hoji and Ishii (2004). Recall that Hoji and Ishii (2004) assume that Japanese FQs apply to the host NPs symmetrically under the restrictive quantification irrespective of the strong/weak quantifiers. But it is impossible to adequately predict the distribution of FQs in Japanese without taking the symmetry/asymmetry distinction into consideration.

4. #-CLs as Adverbs

I will argue in contrast to Sportiche (1988), Kawashima (1998), Bošković (2004) that FQs are adverbial, hence adjoined to VP (vP in the current Minimalist framework), claiming that structural constraints like mutual c-command or structural adjacency are not appropriate enough to predict the distribution of floating #-CLs. Instead I will claim that the contrastive behavior observed between strong and weak quantifiers follows naturally from the interaction of the Mapping Hypothesis and Chomsky's (2000, 2001) phase theory.

4.1 Mapping Hypothesis and Phase

Diesing (1992) proposes that semantic properties such as specificity and partitive are syntactically encoded,

appealing to the Mapping Hypothesis (henceforth, MH) given in (22).

(22) *Mapping Hypothesis*

Mapping from VP is mapped into the nuclear scope.

Material from IP is mapped into a restrictive clause.

(22) requires that only material mapped into the nuclear scope receives non-presuppositional interpretation, whereas only material mapped into a restrictive clause receives presuppositional interpretation. Given this, while presuppositional NPs must stay out of VP, non-presuppositional NPs must occur (be reconstructed) inside VP at LF. For example, the weak NP *two students* and the strong NP *every dog* receive non-presuppositional existential reading and universal (presuppostional) reading respectively, as illustrated in (23) and (24).

(23) a. John blamed two students.

b. $\exists x$[student (x) $\wedge$ x = 2 $\wedge$ blamed (j, x)]

Nuclear Scope

(24) a. Every dog is walking.

b. Every x [x is a dog] [walk (x)]

Quantifier Restrictive Clause Nuclear Scope

According to Diesing (1992), there is a correspondence between the syntactic and the semantic representation of a sentence, and material from inside VP is mapped into the nuclear scope while material from outside VP ends up in the restrictive clause. In (23a) the NP *students*, which is assumed to stay inside VP, receives existential reading via Existential Closure. As illustrated in (23), this operation applies to the intersection of the set of students and the set of those who John blamed, never applying to the set of students asymmetrically. On the other hand, in (24) *every dog* moves out of VP and is mapped into the restrictive clause, where it is subject to the restrictive quantification. The NP *dogs* truly acts as the restrictor of the quantifier.

Furthermore, I will claim that the MH should be reconsidered in terms of the current Minimalist derivation, i. e., phase (Chomsky 2000, 2001). According to Chomsky, derivations proceed phase by phase, the notion of which is defined as follows:

(25) A phase is a syntactic object derived from a lexical subarray containing an occurrence of C and v.

Given (25), a phase is CP or vP, both of which are propositional.

With the discussion so far in mind, let us consider again the contrastive behavior observed between strong NPs and weak NPs in Japanese.

(26) a. *?gakusei-ga sono-hon-o 3-nin yonda

'Three students read that book.'

b. gakusei-ga sono-hon-o zen'in yonda

'All (the) students read that book.'

Recall that a long association as observed in (26b) is allowed only when the host NP receives presuppositional reading, which is forced by universal quantifier. On the other hand, (26a) with the weak quantifier prefers the non-presuppositional reading of the subject NP in the out-of-the-blue context.

Given that the FQ is vP-adjoined, it follows then that (26a) and (26b) obtain the following structures (27a) and (27b), respectively:

(27) a. $[_{vP}[_{QP}$3-nin$][_{vP}$ gakusei-ga v$[_{VP}$ sono-hon-o yonda$]]]]]$

b. $[_{vP}[_{QP}$zen'in$][_{vP}$ gakusei-ga v$[_{VP}$ sono-hon-o yonda$]]]]]$

Furthermore, Object shift applies to the internal argument, *sono-hon*, which is raised to the outer Spec of the vP, as illustrated below:[3]

(28) a. $[_{vP}$ sono-hon-$o_1[_{vP}[_{QP}$3-nin$][_{vP}$ gakusei-ga v $[_{VP}$ t_1 yonda$]]]]$

b. [$_{vP}$ sono-hon-o$_1$ [$_{vP}$ [$_{QP}$ zen'in] [$_{vP}$ gakusei-ga v [$_{VP}$ t_1 yonda]]]]

These representations show the stage where the first Spell-Out takes place. In vP (VP in Diesing's (1992) analysis) where Existential Closure applies, the function denoted by the weak quantifier *3-nin* in (28a) applies to the intersection of the set of students and the set of individuals that *read that book*. There is apparently no association between the shifted NP *sono-hon* 'that book' and the #CL, *3-nin*, but as I mentioned above, the function that the weak quantifier denotes applies intersectively. As claimed by Diesing herself, however, an intersective quantification is imposiible in the case of (28a) because the object NP is located outside the nuclear scope. In other words, the vP -adjoined position is mapped into the restrictive clause, and hence is not subject to Existential Closure. The ungrammaticality of (26a) is attributed to the fact that the plausible quantification fails to apply.[4] [5]

In (26b), on the other hand, whether the object NP shifts outside VP does not matter, because the strong quantifier *zen'in* quantifies over the host (subject) NP under restrictive quantification. In this case the subject NP acts truly as a restrictor for the quantifier. The quantifier *zen'in* requires the associated subject NP to be interpreted at the restrictive clause due to the MH. The subject NP is raised to Spec TP for the requirement of the EPP feature, in which case it is mapped to the restrictive clause, hence subject to restricted quantification. This is semantically represented as in (29):

(29) ∀[students (x)][read (x, that book)]

This semantic interpretation is derived at the next Phase CP after the TP merges with C. The subject nominal is bound at the appropriate position, thus leading to the convergence of the derivation.

4.2 Object-Associated FQs

The analysis here can be extended to another contrastive behavior seen between strong and weak quantifiers. The following are the examples given by Kawashima (1998).

(30) a. 3-satsu Hanako-ga hon-o katta
3-CL H-Nom book-Acc bought
'Hanako bought three books.'
b. *?subete Hanako-ga hon-o katta
all H-Nom book-Acc bought
'Hanako bought all the books.' (Kawashima 1998: 1)

As observed by Kawashima (1998), a #-CL can occur in sentence-initial position, but quantifiers like 'all' cannot. In order to explain this distinction, Kawashima resorts to the Proper Binding Condition (henceforth, PBC), as defined in (31) as well as the MH in (25).

(31) Proper Binding Condition: Traces must be bound.

Let us examine the derivations of (30a, b) given by Kawashima. She extends her argument along the lines of the stranding analysis. The following is the point where the head nominal is scrambled out of the extended nominal phrase α.

(32) [$_{vP}$ [$_{\beta}$ hon-o] [$_{vP}$ [$_{\alpha}$ t(β) subete] katta]]

[3] Tada (1993) observes that scrambling in Japanese has three subclasses: Short-scrambling, Middle-scrambling, and Long-scrambling. The object shift assumed here corresponds to Short-scrambling in Tada.

[4] Nuclear scope is assumed to be VP in Diesing (1992), but it is appropriate to reanalyze it as vP under the current Minimalist framework (Chomsky (2000, 2001)).

[5] Chomsky (2001) claims the distinction between vP and *vP, the latter being assumed as a strong phase where Spell-Out takes place. Here I will not resort to the distinction, but both vP and *vP are subject to cyclic Spell-Out.

And the computation reaches (33) in which the subject NP is raised to the spec of IP and further proceeds up to (34) where α (containing t(β)) is adjoined to IP.

(33) [$_{IP}$ Hanako-ga [$_{VP}$[$_{\beta}$hon-o][$_{VP}$[$_{\alpha}$ t(β) subete] katta]]]

(34) [$_{IP}$ [$_{\alpha}$ t(β) subete][$_{IP}$ Hanako-ga[$_{VP}$[$_{\beta}$ hon-o][$_{VP}$ t(α) katta]]]]

After (34) merges with C, the Spell-Out takes place. The structure of (34), however, shows that t(β) is unbound and thus violates the PBC, so it is forced to be undone (reconstructed) to its departure-site, as in (35).

(35) [$_{CP}$[$_{IP}$ Hanako-ga[$_{VP}$[$_{\beta}$ hon-o][$_{VP}$[$_{\alpha}$ t(β) subete]katta]]]]

Note that the LF-structure of (35) only satisfies the PBC. According to Kawashima, the extended nominal α must satisfy both the PBC and the MH. The material with a strong quantifier is required to be presupposed and thus mapped into the restrictive clause. However, a violation of the MH results if nominal phrases with quantifiers such as *subete* 'all' occur within VP at LF. Hence Kawashima concludes that the extended nominal phrase α in (34) is not allowed to be undone as in the LF-structure of (35): that is, it continues to occupy its scrambled position to circumvent a violation of the MH. Then, the representation (34) is forced, hence violating the PBC.

On the other hand, (30a) containing the #-CL is acceptable. The computation is assumed to proceed in the same way as the one containing *subete* 'all' in (30b). The following is the point where the extended nominal is scrambled to the IP.

(36) [$_{IP}$ [$_{\alpha}$ t(β) 3-satsu][$_{IP}$ Hanako-ga [$_{VP}$[$_{\beta}$ hon-o][$_{VP}$ t(α) katta]]]]

The extended nominal α is undone to its departure-site where the PBC is satisfied, as illustrated in (37). Besides, the nominal with the #-CL can occur inside VP (nuclear clause) at LF because it receives (non-presuppositional) existential interpretation.

(37) [$_{CP}$[$_{IP}$ Hanako-ga [$_{VP}$[$_{\beta}$ hon-o][$_{VP}$[$_{\alpha}$ t(β) 3-satsu]katta]]]]

Note that the LF-representation of (37) guarantees that the nominal α satisfies both the PBC and the MH. In this way, Kawashima deduces the contrast exhibited in (30) from a natural interaction of (i) the PBC and (ii) the MH analysis.

Similarly with my analysis, Kawashima's approach also appeals to the MH to capture the contrastive behavior between (30b) with the strong quantifier and (30a) with the numeral classifier, but there are a few problems that are yet to be dealt with in her approach. One of them is that there is still a strategy in (34) to circumvent the PBC violation without undoing the extended nominal α. That is, if the head nominal β is raised to the IP-adjoined position (be it via QR or scrambling), the PBC is perfectly satisfied as in (38).

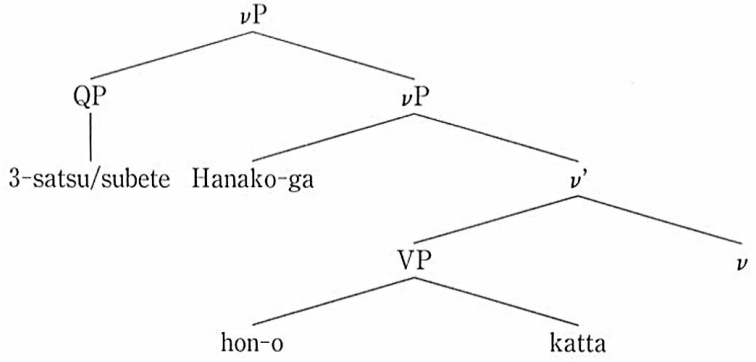
(38) [$_{IP}$[$_{\beta}$ hon-o][$_{IP}$[$_{\alpha}$ t(β) subete][$_{IP}$ Hanako-ga[$_{VP}$ t(β)[$_{VP}$ t(α) katta]]]]

In (38) the trace left behind by the extended nominal α and the trace of β are both c-commanded by their antecedents, respectively, and additionally, the head nominal β can be mapped into the restrictive clause.

Secondly one might wonder why the LF-undoing itself does not leave a trace. Certainly it is unclear why the extended nominal α in (37) does not leave a trace after it is undone to its departure site. It is not convincing at all to merely assume that LF-movement, unlike overt movement, does not leave a trace.

Our approach will deal with the grammatical contrast in (30) more feasibly.

(39)



If the floating QP is vP-adjoined like an adverb, the configuration above is obtained. In this vP structure where the first Spell-Out takes place, the host nominal *hon* 'book' stays within the VP, so that Existential Closure is applicable. Consequently, the Existential Operator applies to the intersection of the set of books and the set of individuals that Hanako bought. This is truly a compatible reading with the function denoted by the weak quantifier *3-satsu*. On the other hand, note that the strong quantifier *subete* 'all' should be interpreted not with respect to the set of the books that Hanako bought, but instead with the set of books. For this reading, the object nominal must stay outside the nuclear scope, but such is not the case in (39). Thus, the contrastive behavior shown in (30) can be given a plausible account. This analysis, unlike Kawashima's, does not need to appeal to the trace-dependent explanation, and furthermore it is more compatible with the phase theory in the current Minimalist Program (Chomsky 2000, 2001).

After (39) merges with T and, further with C, the Spell-Out takes place. This means that the Spec of TP may not necessarily be occupied by any element in my analysis. This is the same line as Fukui (1995) and Kitagawa (1986) pursue in their arguments. This analysis is fully compatible with the Minimalist analysis (Chomsky 2000, 2001), according to which movement arises as a sequence of operations Agree, pied-piping, and Merge. Pied-piping and Merge, which are responsible for phrasal displacement, apply when the functional head has an EPP feature. In the absence of an EPP feature, Agree takes place without movement. If so, the Spec of TP is not necessarily occupied by any element in Japanese by assuming that the functional head T lacks an EPP feature.

5. Conclusion

In this paper, I have examined the semantic and syntactic properties of floating #-CLs and strong quantifiers. It has been claimed that based on the assumption that FQs act as adverbials, they can either be assumed as operators (strong quantifier) of the tripartite structure of quantification or be weak quantifiers. In the latter case, they apply 'symmetrically' and 'intersectively', because they quantify over the intersection of the set of what the subject denotes and the set denoted by the VP, more specifically, the set of the individuals who participate in the VP-denoting events. Splitting FQs in this way helps predict the distribution of FQs in Japanese more appropriately. It has also been claimed that the existential and universal variations are cyclically derived at the Phase level (vP and CP) under Diesing's (1992) Mapping Hypothesis. Consequently, operations such as LF-undoing and LF reconstruction can be obviated.

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